

C.; Mesquite, Tex. 22d, Walla Walla, Wash. 23d, Charleston, Ill.; Vevay, Ind.; Riddleton, Tenn.; Cleburne, Tex. 25th, Kissimmee, Fla.; Beverly, N.J.; Cleburne, Tex. 27th, Keeler, Cal.; Riddleton, Tenn.; Mesquite, Tex. 28th, Vevay, Ind.; Muscatine, Iowa; North Sutton, N. H.; Carrollton, Ohio. 29th, Red Bluff, Cal.; North Sutton, N. H.; Green Bay, Wis. 30th, Red Bluff, Cal.; Lacon, Ill.; Kalamazoo, Mich. 31st, Spearfish, Dak.

Duck, Ga.; a large meteor was observed at 8 p. m., 11th. It shot across the sky from north to west about 20° above the horizon. Its duration was about six seconds.—*Report of Mr. A. L. Gillespie.*

Mesquite, Tex.: two large meteors were observed near the North star at 8 p. m., 14th. The first one started about 20° south and east of the North star; the second one started about 10° southeast of the North star, and travelled south to a point north and 20° west of Jupiter; this one was very brilliant and left a visible path of sparks. Eight smaller meteors were seen at this observation within a space of forty-five minutes.—*Report of Mr. Silas G. Lackey.*

Walla Walla, Wash.: a brilliant meteor was observed at about 8 p. m., 22d, moving in a southeasterly course toward the earth; before it disappeared it exploded, lighting up the sky like a flash of lightning.—*The Daily Union, Walla Walla, Wash., August 23.*

Red Bluff, Cal.: nine small meteors were observed about 15° north of the zenith, between 1.15 a. m. and 2 a. m., 29th. Their general course was southeast, though a few deflected to

the southwest. Two other small meteors were observed at 1.10 a. m., 30th.

Green Bay, Wis.: a brilliant meteor of a golden color, tinged with red, and accompanied by a luminous trail, about 5° long, was observed at 9.30 p. m., 29th. It started near the zenith, moved in a northeasterly direction, and when about 40° above the horizon broke into numerous fragments. The display lasted about ten seconds.

Spearfish, Dak.: a brilliant meteor was observed at 7.30 p. m., 31st. It shot down from north to south, and when close to the horizon it appeared to explode with a flash like burning powder. Its duration was about three seconds.—*Report of Mr. G. H. Warren.*

#### MIRAGE.

Mirage were observed as follows: Webster, Dak., 2d; Woonsocket, Dak., 3d, 4th; Hampton, Iowa, 16th.

#### SAND STORMS.

Winnemucca, Nev., 31st: a gale and sand storm began at 1.05 p. m. and continued until 11.20 p. m.; maximum velocity of the wind forty-four miles per hour from the southwest at 5.35 p. m., and the average velocity during the storm was thirty-two miles per hour. A great deal of electricity was present in the atmosphere during the storm, and a perceptible shock was felt with the finger four inches away from an electric wire. Sand storms were also reported as follows: Wilcox, Ariz., 4th, 9th, 21st; Tuohy's, Cal., 15th; Fresno, Cal., 18th; Dodge City, Kans., 3d; Winnemucca, Nev., 17th, 18th.

### VERIFICATIONS.

#### FORECAST FOR 24 HOURS IN ADVANCE.

[Verifications made by Assistant Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast Division.]

The forecasts for districts east of the Rocky Mountains for August, 1889, were made by Captain H. H. C. Dunwoody, 4th Artillery, Signal Officer and Assistant, and those for the Pacific Coast districts were made at San Francisco, Cal., by 2d Lieutenant J. E. Maxfield, Signal Corps.

*Percentages of forecasts verified, August, 1889.*

States.		States.	
Maine.....	83.0	Tennessee.....	88.5
New Hampshire.....	83.7	Kentucky.....	88.6
Vermont.....	81.8	Ohio.....	85.7
Massachusetts.....	84.5	West Virginia.....	85.0
Rhode Island.....	86.6	Indiana.....	90.5
Connecticut.....	80.3	Illinois.....	89.8
Eastern New York.....	84.3	Lower Michigan.....	88.6
Western New York.....	84.2	Upper Michigan.....	78.8
Eastern Pennsylvania.....	85.9	Wisconsin.....	87.0
Western Pennsylvania.....	84.8	Minnesota.....	85.7
New Jersey.....	82.6	Iowa.....	86.3
Delaware.....	87.1	Kansas.....	81.0
Maryland.....	89.5	Nebraska.....	85.2
District of Columbia.....	84.8	Missouri.....	88.0
Virginia.....	88.8	Colorado.....	86.6
North Carolina.....	85.4	Dakota.....	89.9
South Carolina.....	88.7	Southern California*.....	86.9
Georgia.....	85.4	Northern California*.....	89.2
Eastern Florida.....	91.4	Oregon.....	88.8
Western Florida.....	82.5	Washington Territory*.....	86.7
Alabama.....	87.6	By elements: Weather.....	88.3
Mississippi.....	93.2	Temperature†.....	83.2
Louisiana.....	88.5	Monthly percentage of weather and	
Texas.....	90.6	temperature combined.....	86.3
Arkansas.....	86.3		

\*In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. †The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10. ‡The forecasts of temperature in districts east of the Rocky Mountains were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day.

#### CAUTIONARY SIGNALS FOR AUGUST, 1889.

Statement showing percentages of justifications of wind signals for the month of August, 1889:

*Wind signals.*—(Ordered by Captain H. H. C. Dunwoody.) Total number of signals ordered, forty-six; justified as to velocity, wholly, thirty; justified as to direction, forty-five. Of the signals ordered forty-five were cautionary, of which twenty-nine were justified, and one storm, which was justified. Eighteen were ordered for easterly winds, of which seventeen were justified, and twenty-eight were ordered for westerly winds, all of which were justified. Percentage of justifications, 66.8.

*Percentages of local verifications of weather and temperature signals as reported by directors of the various State Weather Services for August, 1889.*

States.	Weather.	Temperature.	States.	Weather.	Temperature.
Illinois.....	86.9	86.7	Nebraska.....	90.0	88.6
Indiana.....	89.0	89.0	New Jersey.....	85.1	92.9
Kansas.....	82.1	86.7	New York.....	87.5	88.8
Kentucky.....	79.0	95.0	Ohio.....	92.0	87.0
Michigan.....	81.5	85.7	Pennsylvania.....	84.0	90.0
Minnesota.....	83.0	79.0	South Carolina.....	85.5	89.0

### STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts are republished from reports for August, 1889, of the directors of the various state weather services:

#### ALABAMA.

The month just closed has been remarkable for the small amount of rainfall in middle and southern Alabama and the heavy precipitation in northern parts of the state. The average rainfall was 0.80 below the normal. In all portions of the state, except in north Alabama, there has been a deficiency

since the 1st of January, and in many localities the wells are going dry. The temperature was normal. There were no decidedly hot days, and the nights were cool and pleasant.

#### SUMMARY.

*Temperature.*—Monthly mean, 76; highest monthly mean, 80, at Citronelle